5: Schwimmer E-4,5 (1966-1967) 1973
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Mountain Orokaiva

CHAPTER II

THE SETTING

1. *Geography*

Although several good descriptions of the physical environment and general culture of the Orokaiva are available (e.g. Williams 1930, Waddell and Krinks 1968), a brief sketch of the setting of this study may be convenient. The Orokaiva live in the Northern District of Papua, a district bounded on the south-west by the Owen Stanley range, on the west by the Mandated Territory of New Guinea. Although the administrative centre of the district, Popondetta, lies only about 150 miles from Port Moresby, there is no road connection, so that the only communications with the outside world are by air and sea.

The Orokaiva live on the footslopes of Mount Lamington and on the plains to the north and east of these footslopes. This region is, by New Guinean standards, highly favoured by nature, as Brookfield recently emphasised (1966). In a classification of the natural resources of New Guinea according to the degree of limitations to land use[1], Brookfield describes a large territory surrounding Mount Lamington as 'suitable for cultivation with a mild degree of limitation'. This comprises 'some of the largest tracts of such good land in the whole country' (*ibid.* 47–8).

One distinguishing feature of the region is its lithological composition: there is an abundance of Pleistocene and recent volcanic deposits. The total area of such recent ash and lava deposits found in New Guinea is small, but notably fertile. Brookfield maps the annual rainfall of the region as between 100 and 150 inches. This is not so high that the land becomes permanently or semi-permanently waterlogged. On the other hand, the region mostly lacks well-marked dry seasons during which the soil would rapidly dry out. With regard to terrain, the region has extensive areas of low and moderate relief and good drainage. As for density of population, Brookfield paints a somewhat idyllic picture that needs correction: 'the greatest concentration of population, rising locally to 60 per sq. mile, lies on the best land in the area – the little-dissected footslopes of Mount Lamington, where smooth topography is combined with fertile soils and good drainage' (*ibid.* 64).

We find, in fact, that local densities of 200 and more per sq. mile are not at all rare (Rimoldi 1966: 4). In two villages I surveyed, I found population densities to be 180 (Sivepe) and 135 (Hohorita) per sq. mile. Rimoldi's analysis shows that the Sivepe population density is close to the upper limit the land can sustain with present technology and social organisation. The sample he chose (50 persons of the Jegase and Timumu clans) happened to have under-average land holdings, of 138 acres. Rimoldi shows that 110 of these acres are needed for

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subsistence shifting agriculture alone. This leaves hardly any margin for land unsuitable for cultivation, for bush land needed as a source of building materials etc., or for unequal distribution of land as between families.

We may divide the land occupied by Orokaiva into two broad sub-regions. The first is made up of the foothills themselves which have an 8 to 12 inch very dark brown top soil, rich in nitrogen and phosphorus. The fine-textured subsoils range from 10 to 22 inches in depth. This sub-region coincides approximately with the Saiho census division which had a population of 8,211 in 1966 giving a density of about 55 per sq. mile. The second sub-region, situated to the north and east of the first, consists of poorly drained but readily improvable plains. Here the population is very much sparser. Most village domains contain only a fraction of immediately utilisable good cultivation land and even this does not have the special fertility of the volcanic loam on the mountain slopes. The soils of Inoda, a village situated in this sub-region, have been discussed in much detail by Crocombe and Hogbin 1963, quoting the Commonwealth Scientific and Industrial Research Organisation (C.S.I.R.O. [1954]). This sub-region forms part of the Sohe-Popondetta census division which, as a whole, has a population density of about 20 per sq. mile. Villages are smaller and more dispersed.

The boundaries of what we may call the Orokaiva tribal area are probably best determined by the criteria used by the Papuans themselves, namely linguistic criteria. Orokaiva is part of the Binandere group of eight languages (see Wurm 1960) spoken in most of the more densely populated parts of the Northern District; of these languages, Orokaiva is spoken by the greatest number, but only about half the population in the Ovokaiva-Binandere area. The only language of this group for which a reasonably full description (grammar and dictionary) has been published is Binandere (Copland King 1927), a language spoken around the lower part of the Mambare and Gira rivers. Other languages of this group are: Orokaiva, Notu, Aiga, Huniara, Yema, Taindaware. While there are considerable vocabularly differences between these languages, there is a close resemblance in grammar and enough resemblance in vocabularly to make a very limited degree of intercommunication possible. (Chinnery and Beaver 1916 and an unpublished manuscript by Capell [n.d.]). We do not know much more about the Binandere group of languages except that it is a Papuan grouping (Grace 1968).

It seems to me that dialect divisions within the Orokaiva language area which have been noted at various times (Beaver 1916, Williams 1930) are rather minor. A fairly accurate idea of the boundaries of the Orokaiva language area may be obtained by identifying this area with the district administered by the Higaturu Local Government Council which covers the Saiho and most of the Sohe-Popondetta census divisions.

Williams (1930: 157–9) attempts to distinguish the Orokaiva language speakers from other tribal groupings by listing cultural differences (notably in dress and ornaments) but these are not pronounced and, under modern conditions, may be observed only on ceremonial occasions when headgear and bark-cloth are worn.

Prior to European contact, the normal mode of settlement was in hamlets containing 6 to 12 houses and surrounded by land used for shifting agriculture.

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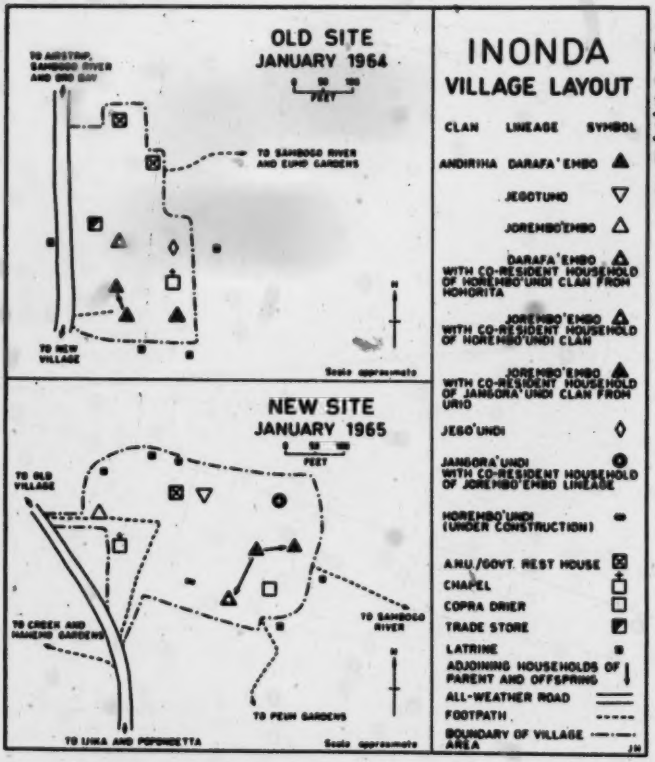

Fig. 4. Inonda village layout.

The leader, a government driver, earned about 65 per cent of the total cash income of the whole village, not only in wages but also through various enterprises on the side. He was the lay preacher as well. The only limit to his influence was the unwillingness of the pagan faction to become involved in 'modern' activities of which he was the champion. 105 622 177

Ecologically, Inonda is characteristic of the alluvial plains region to the east of the mountain. It lies between 200 and 300 feet above sea level, and has a comparatively low rain-fall and long dry periods. Its population density is low: 42 people on a village domain of 2850 acres (less than 10 per square mile). The best Inonda land is 580 acres of coarse-textured recent riverine deposits, covered with forest or regrowth and lying beside the Sambogo and Girua rivers. 133 132 161 162 134 137

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Hohorita. My stay in Hohorita lasted for a month, and I made several return visits. This village lies thirteen miles from Popondetta on the road to Saiho, has forty-one dwelling houses and a population of 358. Hohorita and three contiguous hamlets are the home of the Sangara who survived the Mount Lamington disaster. The Sangara population was reduced by the eruption from some 3,000 to 195 people, who stayed together in the evacuation camp and later founded Hohorita, where the remnants of about a dozen clans may be found. By far the strongest clans in this village are those whose homes, at the time of the eruption, were at the outer edge of the devastation area and who were able to run away from the *nuée ardente* before the searing blast could reach them. 101 105

Hohorita, though built much earlier than Inonda (1957), was not beautified with the same care. The area between the two rows of houses was bare, except for some coconut and betelnut palms. The village was divided into two rectangles by a short row of houses. The front and back part were settled at different times and different clans were dominant. When I was working in the front half I would meet hardly anyone from the back half and vice versa. A feast house had been built in both the front and the back sections of the village. The feasts had been held just a few weeks before my arrival, to entertain neighbouring villages. Originally a combined feast had been planned, but disagreement had prevented it. There was no chapel in the village, but a mission station just next to it, with a white mission teacher, a mission school and several Papuan teachers who were in charge of church services. This was a contrast with Inonda, which was several miles removed from a school and even further from a mission. There was a woman's club with a small club house, but again this was supported by only a small minority.

Hohorita was entirely Christianised, in the sense that everyone had been baptised. A number of the older men had been educated in a mission station prior to the eruption and had become mission teachers while evacuated. When coffee became a lucrative cash crop – more lucrative than teaching – many of them had retired to the village. As a result the leadership pattern differed sharply from Inonda. About twenty men in Hohorita had held down occupations requiring some European skills, and these men tended to work out together the everyday and long-range decisions required in the village. The leading personality was, at that time, a well-educated man, who for years had been the chairman of the Higaturu Local Government Council. In Hohorita virtually everyone was growing coffee. Some men worked in the plantations nearby.

Ecologically, Inonda is characteristic of the alluvial plains region to the east Lamington foothills. Before the eruption, the concentration of population was entirely on the higher reaches of the tribal domain as rainfall and fertility are higher there. The lower portion of the territory, away from the mountain, was used for hunting. But the government discouraged reoccupation of the higher land, for fear of further eruptions. Hohorita is lower down than the old villages. The more elevated land is used a little less than before, and often for coffee rather than subsistence crops. The topsoil is volcanic loam; the rainfall is probably between 120 and 150 inches per annum. Population density is 135 per sq. mile. This is a little less than is usual on the Mount Lamington foothills, but prior to the eruption the population must have been very dense indeed. 133 311 34 132 161

Sivepe. I stayed in Sivepe for about nine months, from September 1966 101

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Sivepe has twenty-four dwelling houses and a population of 137. The two politically dominant clans are Jegase and Seho, but some families from the Sorovi clan had not long ago migrated to Sivepe from a neighbouring village (Garombi). Sivepe had been shifted recently to the present site so that decorative borders were not yet established, though such improvements were started during my stay. It was planned that the village would be rectangular in shape, with two long facing rows, as in Hohorita and Inonda, but a third row, supposedly temporary, had been established on the hill behind the planned site. In other respects, however, the same standard of village layout had been followed. The houses were roomier than in the other villages and had walls of horizontally laid shingles, an innovation of which the villagers were rather proud. 105

Sivepe has no chapel, but the Anglican mission station is less than a quarter of a mile away from the village. The school conducted on the station is one of the best in the Northern District; it teaches up to grade six and many of its students qualify for admission to secondary schools. The station also maintains a small field hospital, with a Papuan assistant medical officer in charge. For more serious cases the large government hospital at Saiho was used, a facility serving the whole of the Northern District, but in practice out of reach of distant villages like Inonda. Hohorita people, however, use it frequently.

Sivepe has been Christianised only very recently. There were no baptisms until after the eruption and the Seho clan did not join the Church until about 1963. Today very few pagans are left and they do not form a political or other faction. Leadership is shared between several strong personalities. Sivepe lacks residents who stand out by superior wealth or European education, but is rather more homogeneous in that respect than either of the two other villages. Money comes mainly from coffee and from remittances sent by relatives working outside the village.

Sivepe, like most of the Sasembata-Sohu valley, has an extremely dense population – about 180 per sq. mile. 161

REFERENCES

1 Brookfield uses the Klingebiel and Montgomery (1961) classification of land which distinguishes land areas by the degree of limitation to land use imposed by geographical conditions. Limitations may be due to terrain, lithology, soil, or climate. A large territory surrounding Mount Lamington falls in classes I to III (which means it is suitable for cultivation with a mild degree of limitation), as contrasted with most of the rest of New Guinea, where the limitations are much greater. 133 134

2 Figs. 1 and 2 give a general impression of the geography of the district: land systems, natural features, settlements roads, tribal areas, etc. Table II/1 shows the distribution of population in the Northern District of Papua. Table II/2 shows the age breakdown of the population in Sivepe and Inonda. Table II/10 shows rather strikingly how suddenly labour migration began: the men of the Seho clan of Sivepe were just a little too old to have been involved, but the Jegase clan, whose members were slightly younger, mostly spent some time on jobs outside the village before or shortly after marriage. 167 164 162

3 Orokaiva: *ina*; botanical: *saccharum edule*. 262

Chapter 2

The subsistence economy

a. Climate and soils

134 The neighbourhood has a warm, moist climate with an average annual rainfall of 160 inches (see Appendix C). Sivopa is between 139 1,250 and 1,300 ft above sea level and nights are often cool. 132 According to the C.S.I.R.O. soils survey (1954:11), the village is on a soil association of the Awala land system which has an 8-12 inch very dark brown top soil. Chemical tests suggest that these loams are fertile, rich in nitrogen and phosphorus. The fine-
133 textured subsoils range from 10 to 22 inches in depth. The terrain is characterised by a gentle radial slope on wide planar ridges between the larger steep-sided streams flowing from Mt Lamington (5,634 ft) into the Kumusi River. Numerous smaller creeks, together with these streams, form an effective fine-textured radial drainage system.

823 The local people recognise 5 types of soil based on differences
134 of colour, texture and moisture.[1]

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[1]
(a) Hohori - any red soil; 2 subtypes are distinguished: i. without sand. This is popular for cultivation; ii. sandy. Avoided if possible as taro does not grow well in it.
(b) Gindiri - any soil which is stony or has a high sand fraction. It may be used for cultivation but in the dry season taro grown in it becomes stunted and the corms are small.
(c) Mumu - this soil is the predominant type in the area. It is the dark brown loam described in the C.S.I.R.O. report as covering almost the whole of the soil association. It is certainly the most widely used and together with Hohori, type i., it gives the best yields.
(d) Pusu - any clay. Taro growth is stunted.
(e) Penare - swampy or waterlogged soils. These are sometimes used during a dry season.

A, [See Category 132, p. 109--Analysis]

245 [654] At the time of our survey no one who had a coffee garden had taken any steps to grow cocoa although one man claimed that as a result of a recent visit by an agricultural extension patrol he now proposes to interplant cocoa[1] with the rubber which he had planted, and another who already has coffee claims that he will plant cocoa in one of his subsistence gardens when it is finished. One man was given cocoa seedlings by some kinsmen but he has made no preparations for transplanting them from the nursery.

Only 2 men have made even minor extensions to their original small coffee gardens. In 1961 one of them added about another 70 Leucaena shade trees. The other has extended his coffee plot with 60 young shade trees.

[134] [654] Lowlands coffee (Robusta coffee) is grown and is well suited by the soils and climate. All planters have access to the dark friable loams (eume) of the area (but 1 plot planted on an abandoned subsistence garden became waterlogged). Crotalaria is used as a shade tree but Leucaena glauca is now established in mature gardens. The shade is planted in lines and the sites for the coffee trees are staked out. Some planters, with assistance from agricultural fieldworkers, arranged these on about a 10 foot triangle but the density of trees varies considerably from one plot to another.

Coffee seeds are bought from the agricultural station or are sometimes given by a neighbouring planter. When the shade is established, they are planted in a nursery sheltered with bush materials. The ground is turned with a bush knife and the seeds covered with a layer of soil. Until transplanting an occasional weeding is all the further attention they receive. Seedlings which have grown to a height of about 2 feet are taken to the shaded lines of stakes and transplanted. No root pruning or preparatory holing of tree sites is carried out. The growers claim a high percentage of strikes from the seedings but since few of the recommended transplanting procedures are followed the vigor and yields of the trees are probably reduced.[2]

For the first few months the ground near the seedlings is weeded and later weeds are cut when growth becomes rank. In theory the owners prune the plots about once a year wherever shoots are too long but the incidence of tall trees and suckering shows that more care could be taken in this aspect of husbandry. [654] Arch-pruning (agobiada) has not been tried on any of the sample

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[1] Extension officers usually do not encourage the planting of cocoa instead of coffee in this area.

[2] See Cole 1960.

Chapter 4

The two communities: Sivepe and Inonda

184 The villages of Sivepe and Inonda represent the extremes of population density, and therefore land availability, in the sub-district. There are significant differences between them in resources and in the degree and character of their participation in the monetary economy and their interactions with the principal external agencies.

Sivepe

133 Sivepe is situated 1,300 feet above sea level on the lower north-
[134] western slopes of Mt Lamington. Its land is classified by the CSIRO
137 survey (1964:32) as belonging to the Awala Land System and is characterised by fertile loam topsoils and a close-textured drainage system. The vegetation comprises predominantly secondary forest
311 and various stages of regrowth, with little grassland. The land-use potential is regarded as high and the fertile, well-drained soils are best suited for perennial (tree) crops.

361 The village is located in the most densely settled part of the sub-district, the Saiho census division, and there are eighteen villages within a radius of three miles (see Map 3). It has been
[131] on its present site for about ten years, but preparation of a new site, less than one mile away, was commenced late in 1964. Sivepe is twenty-eight miles from Popondetta by road, the last three miles being a little-used jeep track linking Awala with the villages on the lower slopes of Mt Lamington. Consequently, coffee and rubber have to be carried to Awala (or nearby Saiho) to be sold and purchases are normally made in the trade stores there. At Awala are a European rubber plantation, a rubber factory which purchases village latex and a well-stocked trade store. At Saiho are two trade stores, the principal Administration hospital for the Northern District (where medical orderlies and infant welfare nurses are trained) and a primary 'T' school. In mid-1964 a daily bus service was established between Saiho and Popondetta.

491 Also in mid-1964, several villages voluntarily commenced the
[499] construction of a new all-weather road, linking Sasembata mission

[TEXT CONTINUED ON PAGE 37]

Only one man owns a mosquito net and there is only one transistor radio in the village. Some of the older people still wear tapa cloths but new ones are seldom made now. The more common form of dress is a pair of shorts, a skirt or a laplap, the skirts being mostly sewn at mothers' union sewing classes run by the Anglican mission at Sasembata.

Two men in the sample own shotguns, costing $58.75 and $59.75. These are the only items in the village representing large capital outlays and several other men had made contributions of $1 and $6 towards their purchase, so they can borrow them in return.

None of the houses conforms to the traditional Orokaiva style, but all are built wholly of local materials. They contain no raised platforms for sleeping, no shelves for food storage, and no cooking facilities other than an open fire. One man has built a 'kitchen extension' to his house while several other households cook primarily in shelters outside. Also, one man has built a simple table and bench outside and some members of the household occasionally eat at this.

A creek running beside the village provides the water for bathing, cooking, laundering, washing dishes and pulping coffee. Paths are narrow and unimproved despite constant use so that they become difficult to negotiate in wet weather. Not all households have pit latrines and those that do only use them irregularly. Small children often defecate on the village surrounds and standing water in various parts is a further health hazard.

Inonda

Inonda lands run from the low plains (200 feet above sea level), beside the Sambogo and Girua rivers, into the foothills of the Hydrographers Range. They include a variety of landforms, soils and vegetation - one-third of the village lands are covered with soils of the Popondetta family, which are well-drained sandy loam volcanic soils, supporting grasslands of Saccharum spontaneum-Imperata cylindrica alliance; one-fifth consists of coarse-textured riverine deposits which are moist, apparently fertile and support forest and regrowth. These are preferred for food gardens, although gardens are also made on the lower valley slopes of the Hydrographers, where the soils consist of well-drained clay loams covered with dense forest or secondary growth. The soils of the foothills are shallow and stony, supporting lower montane rainforest and, as with the grasslands, this area is used only for hunting and foraging. The CSIRO survey classifies most of the Inonda lands as having moderate land-use potential.

133 moderately sloping foothills of the northern side of the extinct strato-volcanic Hydrographers Range. The Sambogo and Girua rivers flow in a northerly direction draining from the Hydrographers Range and Mt. Lamington respectively. They are swiftly flowing, rocky-bedded rivers which, together with their numerous tributaries, give the area a moderate to good drainage system. To the east the drainage system in the vicinity of the Embi lakes has been blocked by recent volcanic activity and drainage is much poorer. A vast coastal plain between twenty and thirty miles wide stretches north-westwards from the Hydrographers for over sixty miles. Inonda lies at the southern end of this plain, about fifteen miles inland from the coast.

134 Soils and vegetation: The Inonda lands are classified below on the basis of the soil associations set out in the Interim Report of the C.S.I.R.O. survey of the Kumusi River-Oro Bay area.(1)

[135] (i) The Popondetta Association covers approximately one third of the Inonda lands. Its soils characteristically have a black to very dark brown topsoil underlain by a yellowish grey volcanic sand subsoil and are usually moderately well drained. They are covered with kunai grass (predominantly Imperata sp.) or savannah and are not used by the people for food gardens because of the difficulty of freeing the ground from grass roots. Because the land is flat there may be some potential for mechanized farming on soils of the Popondetta Association, provided that their natural moderate fertility can be improved or at least maintained under cultivation.(2)

Associated with these soils are small areas of fine textured, recent, alluvial soils, usually covered with forest or

(1) C.S.I.R.O. (Land Research and Regional Survey Section) Interim Report on the Description and Assessment of the Land Systems and Soil Associations in the Kumusi River-Oro Bay Area. Northern Division. Papua. (Unpublished Record) 54/2. June, 1954.

(2) There is still some doubt as to the suitability of this soil for mechanized agriculture as there is a tendency for the soil structure to disintegrate under intensive cultivation.

regrowth. They are lower lying than the surrounding savannah and are poorly drained.

(ii) The Girua Association consists of coarse textured, recent riverine deposits covered with forest or regrowth. It lies beside the Sambogo and Girua rivers. The association covers about one fifth of the Inonda lands and, being permanently moist and apparently fertile, these soils are extensively used for food gardening. The local people have given this soil type the name tumene.

(iii) The Warisota Association occurs on the lower slopes of the valleys of the Hydrographers Range, where the Sambogo river and its tributaries emerge from the foothills. The soils are recent, well drained, medium textured clay loams, becoming fine textured with depth, and being grey to grey-brown in colour. They are covered with a heavy forest or secondary growth vegetation, but there is little accumulation of organic matter in the topsoil.

These soils, which cover approximately one fifth of the Inonda lands, are used for food gardens, although they are not favoured because of their tendency to dry out during the dry season. On the higher ground they are known to the Orokaiva as hora while on the lower ground they are known as hohori. The hohori runs into the still lower lying tumene of the Girua Association.

(iv) The Hydrographer Association lies in the deeply dissected foothills of the Hydrographers Range. The soils of this association are shallow, stony and poorly differentiated, carrying a hill-type rain forest. They are not favoured for gardening and the people use this land only for foraging and hunting. Its agricultural potential has been assessed as "negligible"(1), as both topography and soils are unfavourable for the growth of crops. It occupies approximately one fifth of the total area of the Inonda land.

(1) Ibid, page 36.

134 [197] (v) The Avalanche Association consists of riverine deposits of gravel and boulders interbedded with sheets of sand, lying on the floor of the Girua river. It occupies a very small proportion of the Inonda lands, supports a kunai vegetation, and appears to have no potential for either agriculture or forestry.

132 Climate: The climate is hot and moist, except for a hot, relatively dry season which lasts from about July to September. Because of the influence of the Owen Stanley Ranges there is a rapid west-east decline in rainfall over the Orokaiva area. Popondetta has an average annual rainfall of 96 inches so that Inonda, lying 5 miles to the east, probably has a rainfall of 80 to 90 inches. The yearly pattern of rainfall distribution, which is very similar for both Inonda and Popondetta, can be seen from the rainfall recordings for Popondetta given in Appendix C[A](1)

805 824 The Inonda people refer to the dry season as huvira because the huvira tree (Erythrina indica) flowers at that time. The wet season is divided into a number of periods which are recognized by the ripening of various nuts (especially hauga) and edible pit-pit (ina), and by the flowering of the garepa tree. For instance, the garepa season begins about November or December and lasts for two or three months. These are the wettest months of the year and plant growth is therefore rapid at that time. The pasiro (a variety of pit-pit) ripens about [574] March, which is a time of more moderate rainfall. Food is in abundance at this period, and it is accordingly the most popular season for feasting.

132 241 The warm moist climate is generally favourable for plant growth, but because many of the soils are coarse in texture and have low water-holding capacity, even short periods of drought may adversely affect the growth of shallow rooting crops (including the staple food, taro). Deep rooting crops such as coffee, cocoa and coconuts are less affected by the dry periods.

(1) This average was computed from recordings taken over the 7 year period 1955-61.

A [See Category 132, p. 100--Analyst]

Appendix B

The Ombi-Tara environment and population

131 [133] Ombi village is in the Kokoda sub-district about twenty-seven miles from Popondetta along the main Popondetta-Kokoda road. It is situated on top of a plateau up a steep escarpment, about 250 yards from the main road. Tara is about two miles from Ombi and straddles the access road which runs through the converted land occupying part of two of the blocks. It was previously about two miles further away and was moved to its present site in 1964 after survey of the land to be converted was under way.

133 [361] The Kumusi River flows close to the Popondetta-Kokoda road, about four hundred yards from Ombi village. Ombi village was formerly sited next to the river but was moved to its present higher location in about 1957, reportedly to escape the mosquitoes.

871 872 [368] The nearest school is conducted by the Administration at Ajeka, about two miles away. Most children of the appropriate age attend school daily. Several of the older children board at schools in Popondetta while some children do not attend school at all.

366 439 439 The nearest trade store is at Ajeka but this is seldom open, and most purchases are made from the store operated by a European planter at Awala, a distance of seven miles. Clothing and larger items are purchased in Popondetta.

● 134 The Ombi-Tara lands are part of the Higatura land system which contains a considerable proportion of good land with reasonably fertile soils, suitable for many arable or tree crops as well as pasture.[1]

132 137 The most important features of the climate are the generally heavy rainfall, and the almost uniformly high temperatures and humidities throughout the year. Rainfall ranges from 120 to 150 inches annually and may well be greater in the higher areas, including Ombi-Tara. These climatic features are reflected in abundant plant growth. At Ombi-Tara rainforest covers much of the surrounding land, which is marked by a series of steep ridges.

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[1] See C.S.I.R.O. 1964.

133 Sivepo lies on an altitude of 1,300 feet, seven miles from
[361] Mount Lamington. Although the mountain rises to a height of 5,634
[241] feet, most present settlements are on the lower slopes, rarely very
[931] much higher than Sivepo. A wide range of annual and perennial
[361] crops, including taro, on which the Orokaiva depend, do not grow
well at altitudes much above 1,500 feet. Thus, the eruption has
had no appreciable permanent influence on the location of village
sites. The restricted area is at present a circle of two miles'
radius from the crater of Mount Lamington; there are not now, nor
were there before the eruption, permanent settlements closer than
four miles from the crater.

The Sivepo terrain (if I may borrow the terminology of the CSIRO report) is characterized by a gentle radial slope on wide planar ridges between the larger steep-sided streams flowing from Mount Lamington into the Kumusi River. Numerous smaller creeks, together with these streams, form an effective fine-textured radial drainage system. Drainage is facilitated, moreover, by the extreme porosity of the soil.

134 Sivepo (see Map III)[A] is on a soil association of the Awala
land system which has an 8 to 12 inch very dark brown topsoil.
Chemical tests suggest that these loams are fertile, rich in
nitrogen and phosphorus. The fine-textured subsoils range from 10
[823] to 22 inches in depth. Rimoldi points out that this dominant soil
type, which the Orokaiva call mumu (a word whose principal meaning
is night, darkness), is only one of five found in the district and
distinguished by Orokaiva by colour, texture and moisture. The
others are hobori (red), which is popular for cultivation if it is
not sandy; gindiri (stony, with high sand fraction); pusu (clay)
and pegara (swamp). Mumu is the most widely used soil for gardens.

133 In contrast, Inonda (see Map IV)[B] is no more than 200 to
300 feet above sea level. It lies partly (to draw on the CSIRO
report again) on the flood plains of the Girua and Sambogo rivers
and partly in the moderately sloping foothills of the northern
side of the extinct strato-volcanic Hydrographers Range. The
Sambogo and Girua Rivers flow in a northerly direction draining
from the Hydrographers Range and Mount Lamington respectively.
They are swiftly flowing, rocky-bedded rivers which, together with
their numerous tributaries, give the area a moderate to good
drainage system. To the east the drainage system in the vicinity
of the Embi Lakes has been blocked by recent volcanic activity and
drainage is much poorer. A vast coastal plain between 20 and 30
miles wide stretches north-westwards from the Hydrographers for
over 60 miles. Inonda lies at the southern end of this plain,
about 15 miles inland from the coast.

134 Crocombe and Hogbin classify Inonda soils on the basis of
five soil associations listed in the CSIRO survey: (i) the
Popondetta Association, with black to very dark topsoil underlain
by yellowish-grey volcanic sand subsoil. The topsoil looks like

A [See Cat. 116, p. End Map 3--Analyst]
B [See Cat. 116, p. End Map 4--Analyst]

/134 the *muna* of Sivepa, but it is far shallower, less well drained and
[241] covered with kunai grass (predominantly imperata sp.). It is not used for gardens because of the difficulty of freeing the ground from grass roots. (ii) the Girua Association: coarse textured, recent riverine deposits lying beside the Sambogo and Girua Rivers. This soil, called *tumona* is the favourite gardening land. (iii) the Warisota Association: recent, well drained medium textured clay loams, becoming fine textured with depth and found on the hydrographers foothills. They are grey to grey brown, and are called hora or *hohori*. They are not favoured (though occasionally used) for gardens, as they tend to dry out during the dry season, which is much longer and dryer than at Sivepa. The other two soil types are too stony or sandy to be used for anything except foraging and hunting.

162 There is a striking difference in population density between
161 the two districts. Sivepa, with a population of 137, occupies and owns about 0.75 square miles of land, an average of about 180 persons per square mile. We may compare this with Inonda, with a population of 45 and about four square miles of land--an average of 11 persons per square mile. Sivepa is not at all untypical for the Saiho Census Division in which it is located; this is the division which includes the Mount Lamington foothills as well as some sparsely populated areas in the vicinity. Average population density in this division is 75, with local densities of 200 and over "not at all rare" (Rimoldi, 1966: 4). Inonda also has a population density characteristic of the census division in which it is located; the Buna Division is occupied by about eight persons per square mile (see Table 6).

161 Rimoldi's analysis shows that the Sivepa population density
311 is close to the upper limit the land can sustain with present technology and social organisation. The sample he chose for study (50 persons of the Jegase and Timusu clans) happened to have less land than the average, namely a total of 138 acres. He showed that of this area, 110 acres are required to maintain present standards of subsistence agriculture (1966: 20-21). This leaves hardly any margin for land unsuitable for cultivation and for unequal distribution of land as between families. It also makes little provision for a balance of forest land which must be preserved, as forest resources are essential for the maintaining of the Orokaiva economy. It is true that the other major Sivepa clan (Seho) has greater land resources, and that the Saho people allow the others to use forest trees from their land for building and other purposes. Nonetheless, land resources are almost as tight as they can be.

In contrast, Inonda has plenty of room. When Seva Village joined Inonda after the eruption, there was plenty of garden land for everybody. Crocombe and Hogbin claim that 580 acres may be classed as good garden land, whereas the present level of subsistence gardening can be maintained with 127 acres (1963: 10).

Section 2: Economic Assistance

177 433 Subsistence: Undoubtedly, European contact had a profound influence on the subsistence economy, both through the introduction of steel tools and of the pax Australiana. The government did not, however, intervene directly in the operation of the Orokaiva subsistence economy; it was a very simple economy, but it provided, in general, adequate nutrition and housing. The first time the Orokaiva subsistence 731 economy broke down seriously in the post-contact period was immediately 657 after the eruption of Mount Lamington. The government therefore decided to offer some limited assistance towards the re-establishment of the subsistence economy in the resettlement villages built when the refugees left the evacuation camps. One requirement of the new villages was a food supply until new gardens had been made and harvested. This [241] requirement was met by the planting of a quick-growing variety of sweet potato in villages in the vicinity of Ilimo camp. The government also bought up any root crops the Orokaiva could supply and distributed these in the resettlement villages throughout 1951, as needed.

The opportunity offered by the evacuation camps was also taken 731 to introduce a few innovations which, it was thought, would improve 242 subsistence gardening in the resettlement villages. People were taught the cultivation of the variety of sweet potatoes mentioned above, as well as of corn, tomatoes and beans. Seeds and plants were supplied. An agricultural officer demonstrated on a large scale the growing of [412] sweet potatoes and peanuts. In order to facilitate the rapid establishment of gardens--which the government hoped would be bigger and better than the pre-eruption ones--small spades were distributed to villages. These small spades were not a familiar implement to the Orokaiva, but the agricultural officers thought they would be more efficient than the wooden implements and large shovels hitherto used in villages. These small spades cannot have taken on very well; I saw none in Sivepa or Inonda. I myself had brought a spade for the garden I established in Sivepa, but my neighbour, upon seeing it, at once supplied me with a grubber (ex-American army stock). A very brief acquaintance with the root structure of the garden weeds convinced me that a spade was indeed [227] of limited utility. Finally, in order to add to the supply of protein in the resettlement villages, the camp superintendent distributed some snorkels for catching fish.

Keesing reports there were fears in the camp that the eruption 731 would have destroyed taro seed stock, but this fear proved unfounded. 134 The taro plants remained perfectly healthy and the volcanic ash made the soil amazingly fertile for awhile, so that food shortages were quickly relieved.

Issue of Food: In the camps, rice, tinned meat, tobacco were distributed 731 according to a ration scheme based on the census figures. Each village 657 constable was issued with rations for the number of people resident in the villages under his control. These distributions were continued in